

Common Core Mathematics  
Vertical Alignment by Cluster for Grades PK - 5

	PreK	K	1	2	3	4	5
<b>Operations and Algebraic Thinking</b>							
<i>Understanding addition as putting together and adding to, and understanding subtraction as taking apart and taking from</i>	<b>PK.OA.MA.1</b> Use concrete object to model real-world addition & subtraction problems up through 5.	<b>K.OA.1</b> Represent addition and subtraction with objects finger, mental images, drawings, sounds, acting out situations, verbal explanations, expressions, or equations					
		<b>K.OA.2</b> Solve addition & subtraction word problems and add & subtract within 10 by using drawings or objects to represent the problem.					
		<b>K.OA.3</b> Decompose numbers less than or equal to 10 in pairs in more than one way (by using objects or drawings and record each with a drawing or equation.					
		<b>K.OA.4</b> For any number from 1-9 find the number that makes 10 when added to the given number					
		<b>K.OA.5</b> Fluently add & subtract within 5.					

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<b>Operations and Algebraic Thinking</b>							
<i>Represent and solve problems involving addition and subtraction.</i>			<b>1.OA.1</b> Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing with unknowns in all positions.	<b>2.OA.1</b> Use addition and subtraction within 100 to solve 1- & 2-step problems involving adding to, taking from, putting together, taking apart, and comparing with unknowns in all positions (equations with a symbol for unknown)			
			<b>1.OA.2</b> Solve word problems that call for addition of 3 whole numbers whose sum is less than or equal to 20.				
<i>Understand and apply properties of operations and the relationship between addition and subtraction</i>			<b>1.OA.3</b> Apply properties of operations as strategies to add & subtract (commutative/ associative)				
			<b>1.OA.4</b> Understand subtraction as an unknown-addend problem.				
<i>Add and subtract within 20</i>			<b>1.OA.5</b> Relate counting to addition & subtraction	<b>2.OA.2</b> Fluently add & subtract within 20 using mental strategies (recall from memory all sums of 2 1-digit numbers)			
			<b>1.OA.6</b> Add & subtract within 20 demonstrating fluency for addition & subtraction within 10 (see p 27)				

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<b>Operations and Algebraic Thinking</b>							
<i>Work with addition &amp; subtraction equations</i>			<b>1.OA.7</b> Understand the meaning of the equal sign & determine if equations involving addition & subtraction are true or false				
			<b>1.OA.8</b> Determine the unknown whole number in an addition or subtraction equation relating 3 whole numbers				
			<b>1.OA.MA.9</b> Write & solve number sentences from problem solving situations that express relationships involving addition & subtraction within 20.				
<i>Work with equal groups of objects to gain foundations for multiplication</i>				<b>2.OA.3</b> Determine whether a group of objects (up to 20) has an odd or even number of members			
				<b>2.OA.4</b> Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to expres the total as a sum of equal addends.			

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<b>Operations and Algebraic Thinking</b>							
<i>Represent and solve problems involving multiplication and division</i>					3.OA.1 Interpret products of whole numbers		
					3.OA.2 Interpret whole number quotients		
					3.OA.3 Use multiplication & division within 100 to solve word problems in situations involving equal groups, arrays & measurement quantities.		
					3.OA.4 Determine the unknown whole number in a multiplication or division equation relating 3 whole numbers (p 35)		
<i>Understand properties of multiplication &amp; the relationship between multiplication &amp; division</i>					3.OA.5 Apply properties of operations as strategies to multiply and divide		
					3.OA.6 Understand division as an unknown factor problem.		
<i>Multiply and divide within 100.</i>					3.OA.7 Fluently multiply and divide within 100 (see p 35). By end of Gr 3, know from memory all products of 2 1-digit numbers.		

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<b>Operations and Algebraic Thinking</b>							
<i>Solve problems involving the four operations, and identify and explain patterns in arithmetic</i>					<b>3.OA.8</b> Solve 2-step word problems using the 4 operations. Represent these problems using equations with a letter standing for unknown quantity. Assess reasonableness of answer using mental computation & estimation strategies including rounding.		
					<b>3.OA.9</b> Identify arithmetic patterns (including addition or multiplication table) & explain them using properties of operations.		

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<b>Operations and Algebraic Thinking</b>							
<i>Use the four operations with whole numbers to solve problems</i>						<p><b>4.OA.1</b> Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations.</p> <p><b>4.OA.2</b> Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison.</p> <p><b>4.OA.3</b> Solve multi-step word problems posed with whole numbers &amp; having whole number answers using the 4 operations including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess reasonableness of answers using mental computation &amp; estimation strategies including rounding.</p>	

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<b>Operations and Algebraic Thinking</b>							
<i>Gain familiarity with factors and multiples.</i>						<b>4.OA.4</b> Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a 1-digit number. Determine whether a given whole number in the range 1-100 is a prime or composite.	
<i>Generate and analyze patterns.</i>						<b>4.OA.5</b> Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.	

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<b>Operations and Algebraic Thinking</b>							
<i>Write and interpret numerical expressions.</i>							<b>5.OA.1</b> Use parentheses, brackets or braces in numerical expressions and evaluate expressions with these symbols.



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<b>Operations and Algebraic Thinking</b>							
							<b>5.OA.2</b> Write simple expressions that record calculations with numbers & interpret numerical expressions without evaluating them.
<i>Analyze patterns and relationships.</i>							<b>5.OA.3</b> Generate 2 numerical patterns using 2 given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the 2 patterns and graph the ordered pairs on a coordinate grid.